

Human Body Systems and Disease

7-3 The student will demonstrate an understanding of the functions and interconnections of the major human body systems, including the breakdown in structure or function that disease causes. (Life Science).

7.3.3 Summarize the relationships of the major body systems (including the circulatory, respiratory, digestive, excretory, nervous, muscular, and skeletal systems).

Taxonomy level: 2.4-B Understand Conceptual Knowledge

Previous/Future knowledge: This is the first time in science that students have been introduced to the concept of the relationships between the major body systems. Students will not develop this concept further in high school Biology as the primary focus in that course will be at the cellular level.

It is essential for students to know that each system in the human body performs its own unique function.

Circulatory System

- The main function of the circulatory system is to transport blood to all parts of the body so that gases, nutrients, and waste products are transported to and from the cells.
- The white blood cells within the circulatory system help to fight infection in the body.

Respiratory System

- The main function of the respiratory system is to provide gas exchange between the blood and the air.
- When air is inhaled, the lungs remove some of the oxygen.
- Carbon dioxide is exhaled back into the environment.

Digestive System

- The main functions of the digestive system are to breakdown foods into nutrients that can be used by the body, absorb nutrients that are necessary for energy, growth, and maintenance, and rid the body of solid wastes.

Excretory System

- The main function of the excretory system is to filter out cellular wastes, toxins (chemicals that could be poisonous to the body), and excess water that result from cellular respiration.

Nervous System

- The main functions of the nervous system are to receive stimuli from inside and outside the body, to interpret the stimuli, and initiate responses for survival.

Muscular System

- The main function of the muscular system is to provide movement.

Skeletal System

- The main functions of the skeletal system are to provide support for the body, to protect internal organs, and to provide attachment sites for the muscles.

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Even though each system in the human body performs its own function, the different systems work together and depend on one another for the body to function successfully. Examples of relationships between the major body systems may be:

- All body systems are dependent upon the circulatory system to transport materials.
- The circulatory system works with the excretory system to help remove wastes from the body.
- The respiratory system works with the circulatory system to make sure that oxygen (O₂) reaches the bloodstream and carbon dioxide (CO₂) is removed from the bloodstream.
- The digestive system works with the circulatory system to make sure that nutrients made available by digestion (for example glucose) get to the cells of the body.
- The nervous system works with the muscular and skeletal systems to direct behavior and movement.
- The nervous system controls internal processes in the body (for example digestion and circulation).
- Muscles control the movement of materials through some organs (for example the stomach, intestines, and the heart).
- The muscular and skeletal systems work together to help the body move.

It is not essential for students to know the functions of the reproductive system, immune system, endocrine system, or integumentary system or how these systems work together. The chemical processes within each system are also not essential for this indicator.

Assessment Guidelines:

The objective of this indicator is to *summarize* the relationships between major body systems; therefore, the primary focus of assessment should be to generalize the major points about how the different systems listed in the indicator work together. However, appropriate assessments should also require student to *interpret* a diagram or illustration of interacting body systems; *identify* the function of the individual systems listed in the indicator; or *explain* how the systems listed in the indicator work together.